

**WHAT IS CLAIMED:**

1                   1. A truncated  $\alpha$ -crystallin polypeptide derived from a wild-type  $\alpha$ -crystallin protein,  
2 wherein said truncated polypeptide lacks an N-terminal sequence present in said wild-type protein.

1                   2. The truncated  $\alpha$ -crystallin polypeptide of claim 1 wherein said N-terminal sequence  
2 is hydrophobic.

1                   3. The truncated  $\alpha$ -crystallin polypeptide of claim 2 wherein said N-terminal sequence  
2 precedes a common domain in said wild-type protein.

1                   4. The truncated  $\alpha$ -crystallin polypeptide of claim 1 wherein said N-terminal sequence  
2 comprises residues 1-51 of said wild-type protein.

1                   5. The truncated  $\alpha$ -crystallin polypeptide of claim 4 comprising the sequence set forth  
2 in SEQ ID NO: 3.

1                   6. An isolated polypeptide comprising an amino acid sequence encoded by a nucleic  
2 acid that hybridizes, under stringent conditions, to the complement of a nucleic acid encoding the  
3 polypeptide of claim 1.

1                   7. An isolated polypeptide comprising an amino acid sequence encoded by a nucleic  
2 acid that hybridizes, under stringent conditions, to the complement of a nucleic acid encoding the  
3 polypeptide of claim 4.

1                   8. The polypeptide of claim 1 which is at least 70% identical to a polypeptide  
2 comprising the amino acid sequence set forth in SEQ ID NO: 1.

1                   9. The polypeptide of claim 1 which comprises an amino acid sequence at least 80 %  
2 identical to a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 1 using a  
3 BLAST algorithm.

1                   10. The polypeptide of claim 1 which comprises an amino acid sequence more than  
2 90% identical to a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 1 using a  
3 BLAST algorithm.

1                   11. The polypeptide of claim 1 further comprising a linker sequence at the N-terminus  
2 which is designed to enhance the solubility of said polypeptide.

1                   12. An isolated nucleic acid encoding the truncated  $\alpha$ -crystallin polypeptide of claim 1.

1                   13. An isolated nucleic acid encoding the truncated  $\alpha$ -crystallin polypeptide of claim 4.

1                   14. An isolated nucleic acid that hybridizes, under stringent conditions, to the  
2 complement of a nucleic acid encoding the polypeptide of claim 1.

1                   15. An isolated nucleic acid that hybridizes, under stringent conditions, to the  
2 complement of a nucleic acid encoding the polypeptide of claim 4.

1                   16. The isolated nucleic acid of claim 12 that hybridizes, under stringent hybridization  
2 conditions, to the complement of a nucleic acid comprising the nucleotide sequence set forth in SEQ ID  
3 NO: 2 (Fig. 2).

1                   17. The isolated nucleic acid of claim 15 that hybridizes, under stringent hybridization  
2 conditions, to the complement of a nucleic acid comprising the nucleotide sequence set forth in SEQ ID  
3 NO: 2 (Fig. 2).

1                   18. An expression vector comprising:  
2                   (a) a nucleic acid encoding a small heat shock protein (sHSP); and  
3                   (b) a nucleic acid encoding a protein, polypeptide, or fragment thereof;  
4 wherein said nucleic acids are operatively associated with an expression control sequence.

1                   19. The expression vector of claim 18 wherein said sHSP is selected from the group  
2 consisting of a wild-type  $\alpha$ -crystallin protein; a truncated  $\alpha$ -crystallin polypeptide; thermophilic sHSP;  
3 a chimeric polypeptide comprising (a) a wild-type  $\alpha$ -crystallin protein or a truncated  $\alpha$ -crystallin  
4 polypeptide and (b) thermophilic sHSP; or combinations thereof.

1                   20. The expression vector of claim 19 wherein said chimeric polypeptide comprises a  
2 truncated  $\alpha$ -crystallin polypeptide and thermophilic sHSP.

1                   21. The expression vector of claim 20 wherein said truncated  $\alpha$ -crystallin polypeptide  
2 lacks an N-terminal sequence present in a wild-type  $\alpha$ -crystallin protein.

1                   22. The expression vector of claim 21 wherein said N-terminal sequence is  
2 hydrophobic.

1                   23. The expression vector of claim 22 wherein said N-terminal sequence precedes a  
2 common domain in said wild-type protein.

1                   24. The expression vector of claim 21 wherein said N-terminal sequence comprises  
2 residues 1-51 of said wild-type protein.

1                   25. The expression vector of claim 21 comprising the sequence set forth in SEQ ID  
2 NO: 2.

1                   26. A method of enhancing expression of a protein in a host cell comprising  
2 coexpressing said protein with a small heat shock protein (sHSP).

1                   27. The method of claim 26 wherein said sHSP is selected from the group consisting of  
2 a wild-type  $\alpha$ -crystallin protein; a truncated  $\alpha$ -crystallin polypeptide; a thermophilic sHSP; a chimeric  
3 polypeptide comprising (a) a wild-type  $\alpha$ -crystallin protein or a truncated  $\alpha$ -crystallin polypeptide and  
4 (b) a thermophilic sHSP; and combinations thereof.

1                   28. The method of claim 27 wherein said chimeric polypeptide comprises a truncated  
2  $\alpha$ -crystallin polypeptide and a thermophilic sHSP.

1                   29. The method of claim 28 wherein said truncated polypeptide lacks an N-terminal  
2 sequence present in a wild-type protein.

1                   30. The method of claim 29 wherein said N-terminal sequence is hydrophobic.

1                   31. The method of claim 30 wherein said N-terminal sequence precedes a common  
2 domain in said wild-type protein.

1                   32. The method of claim 29 wherein said N-terminal sequence comprises residues 1-  
2 51 of said wild-type protein.

1                   33. The method of claim 32 wherein said truncated polypeptide comprises the  
2 sequence set forth in SEQ ID NO: 3.

1                   34. A thermotolerant host cell genetically modified to express a small heat shock  
2 protein.

1                   35. The host cell of claim 34 wherein said sHSP is selected from the group consisting  
2 of a wild-type  $\alpha$ -crystallin protein; a truncated  $\alpha$ -crystallin polypeptide; a thermophilic sHSP; a  
3 chimeric polypeptide comprising (a) a wild-type  $\alpha$ -crystallin protein or a truncated  $\alpha$ -crystallin  
4 polypeptide and (b) a thermophilic sHSP; and combinations thereof.

1                   36. The host cell of claim 35 wherein said chimeric polypeptide comprises a truncated  
2  $\alpha$ -crystallin polypeptide and a thermophilic sHSP.

1                   37. The host cell of claim 36 wherein said truncated polypeptide lacks an N-terminal  
2 sequence present in said wild-type protein.

1                   38. The host cell of claim 37 wherein said N-terminal sequence is hydrophobic.

1                   39. The host cell of claim 37 wherein said N-terminal sequence precedes a common  
2 domain in said wild-type protein.

1                   40. The host cell of claim 37 wherein said N-terminal sequence comprises residues 1-  
2 51 of said wild-type protein.

1                   41. The host cell of claim 40 wherein said truncated polypeptide comprises the  
2 sequence set forth in SEQ ID NO: 3.